Acute effects of foam rolling on passive stiffness, stretch sensation and fascial sliding: a randomized controlled trial

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Background
Foam Rolling (FR), an intensive self-massage treatment, aims to mimic the effects of manual therapy and tackle dysfunctions of the skeletal muscle and connective tissue. It has been shown to induce improvements in flexibility, but the underlying mechanisms are poorly understood. The aim of the present study was to further elucidate the acute, systemic and tissue-specific responses evoked by FR.

Methods
In a crossover study, 16 (34±6y, 6f) participants received all of the following interventions in a permutated random order: a) 2x60 seconds of FR at the anterior thigh, b) 2x60 seconds of passive static stretching of the anterior thigh (STR), and c) no intervention (CON). Maximal active and passive knee flexion range of motion (ROM), passive stiffness, sliding of fascial layers, as well as knee flexion angle of first subjectively perceived stretch sensation (FSS) were evaluated before and directly after each intervention.

Results
Flexibility increased only after, FR (active (+1.8±1.9%) and passive ROM (+3.4±2.7%), p=.006, respectively) and STR (passive ROM (+3.2±3.5%), p=.002). Angle of FSS was altered following FR (+4.3° (95% CI: 1.4°-7.2°)) and STR (+6.7° (3.7°-9.6°)), while tissue stiffness remained unchanged after any intervention compared to baseline. Movement of the deepest layer (-5.7mm (-11.3mm – -0.1mm)) as well as intrafascial mobility between deep and superficial layer (-4.9mm (-9.mm1 – -0.7mm)) decreased only after FR.

Conclusion
FR improved knee flexion ROM without altering passive stiffness, but modified the perception of stretch as well as the mobility of the deep layer of the fascia lata. The mechanisms leading to altered fascial sliding merit further investigation.